REMARKS

Receipt of the office action mailed September 13, 2010 is acknowledged. Claims 1-6 are pending in the application and have been rejected under 35 U.S.C. §103(a) as being unpatentable over Balsells (U.S. Patent No. 4,890,937) in view of Balsells (U.S. Patent No. 6,161,838). The Kano reference is also mentioned at pages 3 and 5 of the detailed action. In keeping with the foregoing amendments and the following argument, reconsideration of the rejected claims is respectfully requested.

Showing under 37 CFR 1.116(b)

The Applicants respectfully submit that the foregoing amendments to claim 1 along with the supporting argument, and the arguments in support of claim 4, were not presented earlier for good and sufficient reason. Specifically, the Applicants may have misunderstood the Office's prior reading of the combined teachings of the Balsells '937 and '838 references. Consequently, Applicants now can phrase the claims in a manner which more clearly defines over the cited art, and can articulate arguments that emphasize the impediments to a proper *prima facie* case of obviousness. Therefore, Applicants respectfully request that the Examiner enter the present amendment.

Initially, Applicants believe the mention of the Kano reference once again is in error. Applicants traverse any rejection based even in part on any mention of the Kano reference. For at least this reason, and because the rejections of independent claims 1 and 4 both refer to structural aspects of the Kano reference, all rejections are overcome, and all claims are in allowable form.

Nevertheless, in order to advance this case to issue, Applicants are making selected amendments and submit the following remarks.

In accordance with an exemplary aspect, a disclosed gas seal structure may embody a number of limitations, including:

> A: the gas seal structure is for use with a gas which has a high permeability with respect to a rubber member, with the gas seal structure disposed
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> B: the sub-seal means is disposed between the two seal surfaces, with the sub-seal means being located toward or adjacent to a higher-pressure region, such that the sub-seal means is exposed to the gas having the high permeability with

respect to rubber, and with the main seal means disposed toward a lower pressure region

C: the sub-seal means is made of resin

D: a pressure variation reducing means is disposed between the main seal means and the sub-seal means and has a variation reducing space connected only to a gap formed between the two seal surfaces, with the variation reducing space being closed by the main seal means and the sub-seal means such that the variation reducing space is disconnected from atmosphere

With the incorporation of aspect B, despite the fact that the gas is present in the high-pressure region, and despite the fact that gas is highly permeable with respect to a rubber member, the main seal is protected from exposure to the gas because the arrangement suppresses flow of the gas toward the main seal means. Consequently, any pressure variation of the gas surrounding the main seal means also is suppressed.

With the incorporation of feature C, it is possible to inhibit the occurrence of the blistering phenomenon in the main seal means on the high-pressure side, and to thereby inhibit reduction or degradation of the sealing ability of the main seal, which otherwise would be caused by the blister phenomenon. This reduction of the blistering phenomenon is possible because, by suppressing the flow of gas toward the main seal means, even in the face of rapid pressure changes on the high-pressure side of the device, pressure variations at the face of the main seal means are suppressed.

With the feature D, a pressure variation transmitted from the sub-seal means toward the main seal means can be reduced in the variation reducing space, and the space is connected only to the gap between the two seal surfaces. Therefore, it is possible to inhibit a rapid change in the pressure of the gas surrounding the main seal means. In this manner, the invention of the present application can be used with the gas which has high permeability with respect to the rubber member, without occurrence of the blister phenomenon in the main seal means, thus preventing or inhibiting any reduction of the sealing ability of the main seal means.

With the foregoing in mind, claim 1 has been amended and now positively recites, in part, that the sub-seal means that is made of resin and is disposed between the two seal surfaces, that the sub-seal means is located closer to a higher-pressure region than the main seal means, that the sub-seal means is provided with a concave groove, and that

the higher-pressure region is arranged to receive the gas having a high permeability with respect to a rubber member, such that the sub-seal means is positioned to be exposed to the gas. Claim 1 is further amended to recite a pressure variation reducing means disposed between the main seal means and the sub-seal means and having a variation reducing space connected to a gap formed between the two seal surfaces, with the variation reducing space being closed by the main seal means and the sub-seal means, such that the variation reducing space is disconnected from atmosphere. The amendments are based on paragraphs [0001], and [0030] and do not constitute a new matter.

With respect to the cited art, Balsells `937 discloses a cartridge type spring loaded shaft, in which two seals 124 and 130 are provided between two seal surfaces, and a gap is formed between the two seals 124 and 130. However, the invention of Balsells `937 relates to a seal structure for lubricating oil, rather than the seal structure for the gas which has high permeability with respect to the rubber member (feature A). Consequently, on Balsells `937, the sub-seal means is not exposed to a gas having a high permeability with respect to a rubber member.

Moreover, one would not alter the Balsells '937 reference to receive such a gas, because the Balsells '937 reference expressly teaches the use of elastomeric seals at col. 3, lines 47 and 51. If one were to make the needed modification and prepare to expose one of the seals to the gas having high permeability with respect to rubber, then the expressly-taught elastomeric seals would have to be discarded. On the other hand, at col. 2, line 4 and col. 3, line 60, the reference expressly teaches the introduction of lubricating oil into the space surrounding the moveable shaft. If one were to discard one elastomeric seal in favor of a resin seal, then the substituted seal would not be suitable for sealing lubricating oil. In either case, there can be no proper suggestion to make the needed modifications, because the changes either destroy the expressly-taught aspects of the reference, or render the reference unsuitable for its intended purpose. Thus, there cannot be a proper *prima facie* case of obviousness based even in part on Balsells '937. The secondary reference cannot cure the deficiencies of the primary reference. Claim 1 is allowable for at least these reasons.

In addition, on Balsells '937 the gap between the seals 124 and 130 is connected to conduits 140, 142, which are used when the lubricating oil is supplied to the gap or measuring leakage of a fluid into the gap. Therefore, it is clear that the space between the seals 124 and 130 is connected to atmosphere and is not closed as presently

claimed by amended claim 1. In the open structure of Balsells '937, a gas leaking into the gap leaks to the atmosphere via conduits 140, 142. Therefore, the invention of Balsells cannot be used as the gas seal structure, and is unable to prevent the blistering phenomenon at all. As should be appreciated, Balsells `937 does not disclose that there is a closed gap between the seals 124 and 130 (feature D). Moreover, one would not make the needed modification, as the modification would inhibit the ability to introduce lubricant into the device. Thus, again there is no proper *prima facie* case of obviousness with respect to this limitation, and claim 1 is in allowable form for this reason as well.

Further, the invention of Balsells '937 is directed to preventing uneven wear on a bearing, and the invention of Balsells uses the lubricating oil to achieve this purpose. However, with the use of lubricating oil, the blistering phenomenon simply will not occur in the seals 124 and 130. On the other hand, if the seal structure of Balsells is used for the gas, the gas leaks and diffuses to outside through the conduits 140, 142 because the space is not closed or disconnected from atmosphere as presently claimed. Consequently, with this leakage on the device of Balsells '937, blistering would remain a problem. By comparison, the claimed device prevents the gas from leaking to atmosphere, acts to suppress the occurrence of the blister phenomenon caused by a rapid pressure change of the gas, and inhibits the resulting leakage of the gas into atmosphere which would be caused by reduction of sealing ability due to the blistering phenomenon. To achieve this object, the invention of the subject application has the features A to D, and is different in technical concept from Balsells `937 which does not have the features A to D.

Although Balsells `838 discloses that seals are made of plastic, it does not disclose that a resin-made seal member is disposed on the high-pressure side (feature B). In addition, Balsells '838 does not disclose that the gas seal structure is used with the gas which has high permeability with respect to the rubber member (feature A) and that the gap is disposed between and closed by the two seals (feature D). Therefore, Balsells '838 is different from the invention of the subject application in at least the features A, B, and D. As should be appreciated, the invention of the subject application cannot be made in view of a combination of Balsells '937 and Balsells `838.

For any one of the foregoing reasons, claim 1 is in allowable form, as are dependent claims 2 and 3.

Claim 4 recites a main seal comprising a rubber material, the main seal disposed between two seal surfaces, the rubber material having a high permeability when exposed to a gas having a low molecular weight, a sub-seal comprising a resin material, with the sub-seal disposed between the two seal surfaces, the sub-seal disposed closer to a higher-pressure region than the main seal, and with a concave groove formed in the sub-seal. A gap is formed between the two seal surfaces adjacent the sub-seal, and an enclosed pressure variation reducing space is disposed between the main seal and the sub-seal and in flow communication with the gap. The pressure reducing space is closed by the main seal and the sub-seal, the pressure variation reducing space having a volume arranged to inhibit occurrence of a blistering phenomenon in the main seal.

By comparison, applicants incorporate by reference the arguments presented above, and claim 4 is in allowable form, as are dependent claims 5 and 6.

In view of the foregoing, the above-identified application is in condition for allowance. In the event there are any remaining issues that the Examiner believes can be resolved by telephone, the Examiner is respectfully invited to contact the undersigned attorney at (312) 474-6300.

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Respectfully submitted,

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